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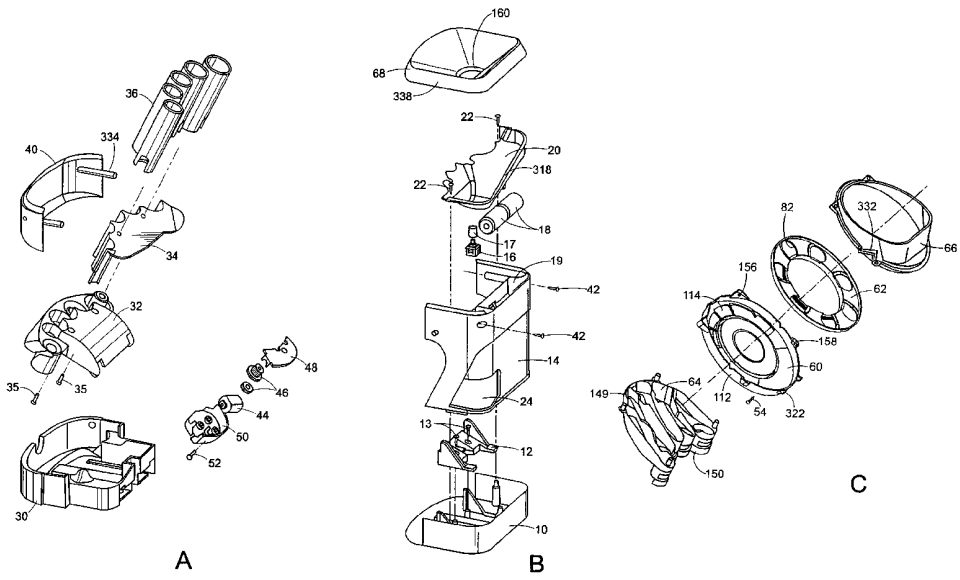
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(54) Title: COIN BANK



(57) Abstract: A coin bank includes a housing (10, 14, 40, 410, 414, 440) having a coin receiving area (68, 468) for receiving unsorted coins, a coin sorting area (60, 62, 450, 452, 460, 462) for sorting the unsorted coins and a coin storage area (36, 436) for storing sorted coins. The coin storage area includes a drawer (30, 430) slidably mounted in the housing and a coin tube support (32, 432) mounted in the drawer. The drawer can be moved in relation to the housing. A plurality of coin tubes (36, 436) is mounted in the coin tube support for holding sorted coins. The plurality of coin tubes can be inclined in relation to a vertical axis for receiving sorted coins.

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COIN BANK

Background of the Invention

The present invention relates to a coin bank. More particularly, the present invention relates to a coin back which separates, sorts and stores five different denominations of coins.

Coin sorting devices are generally known. A user places one or more coins in a hopper or similar coin receiving location. A coin separating mechanism separates the coins and moves them, hopefully one at a time, into a coin sorting mechanism. The coin sorting mechanism classifies the coins by their diameter. Coins of a particular diameter, and consequently of a particular denomination, are directed into the appropriate one of a plurality of sorted coin storage containers. The containers are accessible in order that the sorted coins can be removed.

Coin separating mechanisms employing rotating coin separator plates are known. One such separator plate is in the form of a disk having four U-shaped notches formed in its periphery. Each notch is sized to be larger in width than the largest coin which is to be sorted by a coin sorter. The separator plate is mounted on a planar base of the receiver, the base being fixed to an upper housing at a slope of approximately 45° from the horizontal. Coins tend to come to rest in the lowermost portion of the receiver with their faces contacting the separator plate or the base. When the separator plate is rotated, it will engage a coin with the edge of one of its notches and carry the coin upward to an opening formed in the base where the coin will fall through into an upper portion of a coin ramp leading to a sorting ramp. The ramp has apertures of increasing size through which the coins fall into sorted coin containers.

However, this known coin separating mechanism is not capable of sorting coins of five different denominations.

Moreover, the known mechanism does not employ a drawer in which the coin containers are held in order to allow an easy removal of the coin containers from the housing of the coin bank. Another deficiency in known coin sorters is that the coins being sorted bounce or wobble, especially just upstream of the sorted coin containers. This reduces the coin counting consistency and accuracy of the known banks.

Accordingly, it is desirable to develop a new and improved five coin bank which would overcome the foregoing deficiencies and others, as well as providing better and more advantageous overall results.

Brief Summary of the Invention

In accordance with still another aspect of the present invention, a coin bank is provided.

More particularly, in accordance with this aspect of the invention, the coin bank comprises a housing including a coin receiving area for receiving unsorted coins in a coin sorting assembly mounted in the housing. A drawer is slidably mounted in the housing beneath the coin sorting assembly. A coin tube support is mounted in the drawer. A plurality of coin tubes is mounted in the coin tube support for holding sorted coins. The drawer moves from a retracted position to an extended position in relation to the housing.

Brief Description of the Drawings

The invention may take physical form in certain parts and arrangements of parts, a preferred embodiment of which will be described in detail in this specification and illustrated in the accompanying drawings which form a part hereof and wherein:

Figure 1A is an exploded perspective view of a first portion of a coin bank according to a first embodiment of the present invention;

Figure 1B is an exploded perspective view of a second portion of a coin bank according to the present invention;

Figure 1C is an exploded perspective view of a third portion of a coin bank according to the present invention;

Figure 2 is an enlarged assembled perspective view of the coin bank of Figure 1 with a drawer thereof shown in an extended position and with a cover thereof removed;

Figure 3 is a front-elevational view of the coin bank of Figure 2 with the drawer shown in a retracted position;

Figure 4 is a perspective view of the coin bank of Figure 2 taken from a right rear thereof;

Figure 5 is a side-elevational view of the coin bank of Figure 2 with the drawer shown in a retracted and in a partially extended position;

Figure 6 is a side-elevational view of the coin bank of Figure 2 with the drawer shown in a fully extended position;

Figure 7A is an exploded perspective view of the drawer of Figure 2;

Figure 7B is an enlarged assembled view of a portion of the drawer of Figure 7A;

Figure 8 is an enlarged perspective view of a base of the coin bank of Figure 2;

Figure 9 is an enlarged top plan view of the coin slide of Figure 1B;

Figure 10 is an enlarged perspective view of a coin tube base of the coin bank of Figure 1A;

Figure 11 is an enlarged perspective view of a support wall of the coin bank of Figure 1A;

Figure 12 is an enlarged perspective view of a back housing of the coin bank of Figure 1B;

Figure 13 is a rear perspective view of a coin slide of Figure 9;

Figure 14 is an enlarged perspective view from the front right of a portion of the coin slide of Figure 13;

Figure 15 is a schematic side elevational view illustrating coins overflowing a reservoir positioned above a coin tube of the coin bank and flowing into an overflow area;

Figure 16 is a schematic side-elevational view of the coin bank as the drawer is pulled out, thus allowing the overflow coins in the reservoir to flow into the overflow area;

Figure 17 is an exploded perspective view of a coin bank according to a second embodiment of the present invention;

Figure 18 is an assembled view of the coin bank of Figure 17 on an enlarged scale; and,

Figure 19 is a top plan view of the coin bank of Figure 18 with a lid removed.

Detailed Description of the Preferred Embodiments

Referring now to the drawings, wherein the showings are for purposes of illustrating several preferred embodiments of the invention only and not for purposes of limiting same, Figures 1-16 show a coin bank in accordance with a first preferred embodiment of the present invention.

With reference now to Figure 1B, the coin bank, according to the present invention, comprises a base 10 on which is positioned a ramp 12. The ramp is preferably secured to the base by suitable fasteners 13. Mounted on the base 10 is a back housing 14. Secured to the back housing is a switch 16 on which is mounted an activation button 17. One or more batteries 18 can be mounted in a battery housing compartment 19 formed in the back housing 14. A coin overflow compartment 20 can be mounted to the base 10 via suitable fasteners 22. An overflow coin removal opening 24 is located in the back housing 14.

With reference now also to Figure 1A, slidably mounted in the base 10 is a drawer 30. Housed in the drawer 30 is a coin tube base 32 having a rear support wall 34 which is secured to the coin tube base 32 by suitable fasteners 35. Several coin tubes 36, one for each denomination of coins meant to be sorted, are selectively mounted on the coin tube base 32 and are supported by the support wall 34, which has suitably shaped indentations for that purpose. A front wall 40 of the apparatus is mounted to the back housing 14 by suitable fasteners 42 (Fig. 1B). The front wall 40 is located above the drawer 30 and is spaced therefrom by at least the length of the coin tubes 36. A motor 44 of the apparatus has an output shaft (not visible in Figure 1A) connected to a gear train having a plurality of gears 46. The motor 44 and the gears 46 are mounted in a housing assembly having an upper housing portion 48 and a lower housing portion 50, which are secured together by a fastener 52.

With reference now to Figure 1C, suitable fasteners 54 are employed to mount a wheel housing 60 in place in the apparatus. The motor housing halves 48 and 50 are secured by the fastener 52 to a lower face of the wheel housing 60. Mounted on the wheel housing 60 is a separating wheel 62. Positioned below the wheel housing 60 and mounted thereto is a coin slide 64. A cover or hopper 66 is mounted above the wheel housing 60. With reference again to Figure 1B, a funnel 68 constitutes a top portion of the coin bank. The funnel is selectively removable from the coin bank to provide access to the separating wheel 62. The button 17 protrudes through an opening 70 (Figure 4) in the funnel for access thereto.

With reference now to Figure 9, the coin slide 64 is provided with five coin sliding surfaces 140, 142, 144, 146 and 148. These coin sliding surfaces are meant to accommodate five different diameters of coins. If United States coinage is being sorted, the coins are the dime, penny, nickel, quarter and dollar coins. When such coins

are sorted, the dime coin will slide down sliding surface 140 with the penny sliding down surface 142, the nickel down surface 144, the quarter down surface 146 and the dollar down surface 148. Coins are fed to these five sliding surfaces from varying width openings 114 (Fig. 1C) in the wheel housing 60 as explained in greater detail in the copending application referenced above. The coins are delivered to the openings in the wheel housing via apertures 82 (Fig. 1C) of the separator wheel 62 as it rotates.

The coin slide slopes from an upper end 149 to a lower end 150. Positioned at the lower end of each of the coin sliding surfaces 140-148 is a respective opening 152a-152e. It should be apparent that the several openings 152a-152e are of different diameters, with the aperture 152a having the smallest diameter and the aperture 152e having the largest diameter. The diameters of the apertures 152a-152e are each slightly larger than the diameter of the coin meant to be accommodated in a respective one of the slides. The diameters of the apertures 152a-152e correspond with the widths of the openings 114 (Fig. 1C) in the wheel housing 60.

A pair of spaced ears 154 are located on the upper end 149 of the coin slide 64. These ears 154 cooperate with suitable ears 156 (Fig. 1C) extending away from a skirt 112 of the wheel housing 60. Similarly, spaced posts 157 extend away from the lower end of the coin slide adjacent the smallest and largest diameter apertures 152a and 152e. The posts 157 cooperate with ears 158 (Fig. 1C) extending away from the skirt 112 of the wheel housing 60. Suitable fasteners, not illustrated, enable the coin slide 64 to be mounted beneath the wheel housing 60 via the cooperating ears 154 and 156 and posts 157 and ears 158. Note that the center portion of the coin slide lower end 150 is somewhat recessed in relation to the two wings thereof to form a somewhat crescent-shaped lower end 150. This shape allows the motor housing 48, 50 to be secured to

the wheel housing while not interfering with the coin slide 64.

With reference now to Figure 8, the base 10 of the present invention comprises a bottom wall 170. Extending upwardly from the bottom wall are a pair of triangularly shaped flanges 172. These each have an edge 173 which serves as a roller contact surface. Also provided is a centrally located drawer guide 174. A plurality of peripheral stems 176 project upwardly from the bottom wall 170, adjacent a skirt 177 extending upwardly from the bottom wall 170. Also provided are a pair of central stems 178.

With reference now to Figure 7A, the ramp 12 includes a pair of recessed areas 190. These are aligned with the central posts 178 to correctly position the ramp 12 on the base. The fasteners 13 secure the ramp 12 to the base 10. The ramp 12 includes a pair of spaced overhangs 194 which are aligned with the flanges 172 of the base and overlie the flanges. Each of the overhangs 194 comprises a first substantially horizontal section 196, a second upwardly angled section 198 and a third curved section 200. The overhang sections track the shape of the flanges 172 to maintain a relatively constant distance therebetween, as best seen in Figure 7B.

With continued reference to Figure 7A, the drawer 30 comprises a base wall 210 in which are provided a pair of spaced slots 212. The slots are aligned with and accommodate the flanges 172 and overhangs 194 of the base 10 and ramp 12. The slots 212 are long enough so that while the drawer reciprocates in relation to the base 10, the ramp 12 is stationary, along with the base 10, and the drawer simply slides in relation to these two elements. To this end, the drawer is provided with a raised guide surface 214 which is aligned with and overlies the drawer guide 174 of the base 10. The drawer also comprises a front wall 216 in which a centrally positioned finger recess 218 is located.

With reference now to Figure 10, the coin tube base 32 comprises a bottom wall 230 in which are provided a plurality of recessed areas, namely, first, second, third, fourth and fifth recessed areas 232-240. Each of the recessed areas has projecting upwardly from a bottom wall thereof a respective centrally located post 242-250. The posts are of differing heights to allow a desired number of coins to be held in each of the coin tubes 36. A skirt 252 depends from a front edge of the bottom wall 230. A pair of stems 254 project away from opposing sides of the skirt. Centrally positioned in the skirt is a depressed area 256. Extending upwardly from the bottom wall 230 and positioned rearwardly of the recessed areas 232-240 is a plateau 258. Located in the plateau are a pair of recessed areas 260. The plateau also includes a scalloped front edge 262 which is meant to accommodate portions of the several coin tubes 36. A rear edge 264 of the bottom wall 230 includes a pair of cut-outs 266.

As best illustrated in Figure 7B, an axle 268 extends into each cut-out. A roller 270 is mounted on each of the axles 268. The rollers 272 are trapped between edges 173 of the flanges 172 and the overhangs 194 of the ramp 12 when the coin tube base 32 is mounted in the drawer 30. As the drawer 30 is extended and retracted, the coin tube base 32 pivots in relation to the drawer, as shown in Figures 5 and 6. To this end, the stems 254 on the coin tube base 32 are mounted in sockets 272 (Fig. 7A) defined on the inner surface of the drawer front wall 216. A forward tipping of the coin tube base 32 is limited by the overhangs 194. The coin tube base is guided in its tipping motion by the rollers 272 moving between the flange edges 173 and the overhangs 194.

With reference now to Figure 11, the support wall 34 includes a scalloped front surface 280 which is meant to accommodate the varying diameters of the several coin tubes 36. A bottom edge 282 of the support wall 280 includes a pair of tabs 284. The tabs 284 mount in slots 286 in

flanges 288 positioned on a rear surface 290 of each wing 292 of the coin tube base 32, as shown in Figure 10. The support wall 280 also includes a top wall 294. Positioned in the top wall are a pair of apertures 296 which lead to posts 298. The posts 298 mount into the recessed areas 260 of the coin tube base plateau 258. The fasteners 35 (Fig. 1A) secure the posts 298 of the support wall 34 to the coin tube base 32. A raised section 300 is located at one end of the top wall 294.

With reference now to Figure 12, the back housing 14 comprises a rear wall 310 and first and second side walls 312 and 314. Positioning ribs 316 are located on the rear wall for mounting a rear edge 318 of the overflow container 20 illustrated in Figure 1B. Also provided on the rear wall are a pair of sockets 320 (only one of which is visible) for accommodating a pair of tabs 322 (Fig. 1C) on the wheel housing 60. Extending from a lower edge of the back housing rear wall is a fastener mount 324. Positioned adjacent a top end of the back housing rear wall 310 is the battery compartment 19. The coin overflow removal opening 24 is provided in both the rear wall 310 and the first side wall 312. Also located on the first side wall 312 is a fastener mount 326 and a pair of spaced positioning ribs 328 as well as a tubular socket 330. The positioning ribs hold tabs 332 (Figure 1C) of the cover 66 between them. The socket 330 accommodates a stem 334 extending from the front wall 40. The first side wall 312 also includes a tapered top edge 336 which accommodates a bottom edge 338 of the funnel 68 illustrated in Figure 1B. It should be apparent that the second side wall 314 has a design similar to the first side wall with the exception that there is no coin overflow opening, such as opening 24, located in the second side wall.

The separating wheel 62, the wheel housing 60, as well as the coin slide 64, coin tube base 32, support wall 34 and drawer 30 can all be manufactured from suitable conventional plastic material. Alternatively, the

separating wheel and the wheel housing can be formed of a conventional metal. Whatever material is used should be resistant to scratching by the coins being separated and sorted. Similarly, the base 10, back housing 14 and front wall 40 as well as the funnel 68 and cover 66 can also be manufactured from a suitable conventional plastic or metal material.

The operation of the coin sorter according to the present invention is as follows: as coins are dropped into the funnel 68, they will fall through an aperture 160 at the center thereof and fall through the hopper 66 and onto the sorting wheel 62. As the motor 44 rotates the gears 46 in the gear train, the gears will cause the separating wheel 62 to rotate in a clockwise direction. The coins, thus being held in the cover or hopper 66, are then moved and fall into respective ones of a plurality of apertures 82 in the separating wheel 62. As an aperture of the wheel travels over the several increasingly larger sized apertures 114 in the wheel housing 60, each coin being held will fall through the correctly sized opening and fall onto the associated one of the coin sliding surfaces 140-148. The coins will then travel down the slide and fall through the associated ones of the apertures 152a-152e. The coins will then fall into a respective one of the coin containers 36 and be stacked therein.

After the coin sorting process is done, and when it is desired to remove the coins which have been sorted, the drawer 30 is pulled forwardly out of its retracted position and into its extended position. During this process, the coin tubes will be moved away from an angled orientation to an approximately upright orientation as may be seen by comparing Figure 5, in which the coin tubes assume an acute angle in relation to a vertical axis, to Figure 6. During the first part of this motion, the coin tubes will remain in their angled orientation as the rollers 270 travel along the first section 196 of the roller overhang areas 194 illustrated in Figure 7. This is

illustrated in dotted outline in Figure 5. During the second part of the motion, however, the rollers 270 will travel up the flanges 172 and below the second section 198 of the roller overhang areas 194. During this time, the coin tube base 32 will pivot as the stems 254 of the coin tube base 32 rotate in the sockets 272 of the drawer 30. Finally, the rollers reach the third sections 200 of the roller overhang areas 194 as the extended position of the drawer is reached.

At this time, the coin tubes will have reached an approximately upright configuration. In fact, the coin tubes are preferably tilted forward somewhat for ease of removal as illustrated in Figures 2 and 6. It should be recognized, however, that the orientation of the coin tubes would not need to change at all if the drawer could be pulled sufficiently far out of the base. The benefit of changing the orientation of the coin tubes is that the distance between the retracted and extended positions of the drawer can be reduced while maintaining ease of removability of the coin tubes. Now, the coin tubes 36 can be removed from the coin tube base 32 and inverted in order to remove the coins held therein.

With reference now to Figure 13, the coin slide 64 comprises a set of tube sections 350a-350e, one located beneath each of the apertures 152a-152e. In this way, coins which fall through the apertures will fall into a respective one of the tube sections 350a-350e. Positioned in a front wall of each tube section is a respective overflow aperture 352a-352e. Located beneath the tube sections 350 are respective collar sections 354a-354e. The collar sections have a somewhat larger diameter than do the tube sections and are spaced forwardly therefrom to define a scalloped abutment wall 356. It is apparent from Figure 14 that the collar sections 354a-354e protrude from the tube sections 350a-350e.

With reference now also to Figure 15, each tube section 350 overlies a respective one of the tubes 36. To

this end, the tube section 350a-350e are of varying diameters to align with the varying diameter tubes 36 and accommodate coins of differing diameters. The smallest diameter one of the coin tubes 36 and tube sections 350a are illustrated in Figure 15, it being appreciated that the remaining tube section and coin tubes have an identical relationship. When coins have completely filled the coin tube 36, they will accumulate in the tube section 350 until a top-most one of the coins is aligned with the overflow aperture 352a. At this point, due to the angle at which the coins are held, the force of gravity will urge an overflow coin 360 to slide out through the overflow aperture 352a. This coin will fall into the overflow tray 20 illustrated in Figures 1B and 4.

However, several coins, termed reservoir coins 362, are trapped in the tube section 350a between an upper edge of the coin tube 36 and the overflow aperture 352a. This portion of the coin tube section 350a functions as a reservoir 364. The reservoir holds anywhere from one to five, and preferably three, reservoir coins 362. In order for the reservoir to function correctly, the distance between the top edge of the coin tube and the bottom edge of the tube section has to be thinner than the thickness of the coin meant to be accommodated in the coin tube. This relationship is illustrated in Figure 15. When the drawer 30 is slid forwardly, as illustrated in Figure 16, the reservoir 364 is emptied and the reservoir coins 362 are allowed to fall out and into the overflow tray 20. However, the coins 368 in the coin tube will remain in place.

The purpose for the reservoir is to stabilize the stack of coins, enable a correct stacking thereof and prevent a skip-off of coins. Moreover, the reservoir allows for a precise count of coins in the coin tube 36. In other words, misalignment of coins in the coin tube 36 is prevented by allowing the stack of coins to build up higher than the top of the coin tube. However, as the coin

tubes are moved away from their sorting position, the reservoir 364 is emptied and a coin tube having the exact desired number of coins can be removed from the coin sorter.

With reference now to Figure 17, a coin bank according to a second preferred embodiment of the present invention is there illustrated. This coin bank comprises a base 410 mounted to which is a back housing 414. Slidably mounted in the base 410 is a drawer 430. Housed in the drawer 430 is a coin tube base 432. Several coin tubes 436, one for each denomination of the coins meant to be sorted, are selectively mounted on the coin tube base 432. In this embodiment, since the coins meant to be sorted are Euro coins, eight (8) coin tubes are shown as being mounted in the base 432. A front wall 440 of the apparatus is mounted to the back housing 414 by suitable fasteners. The front wall 440 is located above the drawer 430 as is more evident from Figure 18. A motor 444 of the apparatus has an output shaft 445 connected to a gear train including a plurality of gears 446. The motor 444 and the gears 446 are mounted in a motor housing 448.

A first wheel housing 450 is positioned below the motor housing 448. Mounted on the first wheel housing 450 is a first separating wheel 452. An axle 454 driven by the motor 444 and having a gear 455, 456 at each end extends down to the first separating wheel. Positioned above, and to one side of, the first separating wheel 452 is a second motor housing 460 and a second separating wheel 462 as is best illustrated in Figure 19. The first gear 455 cooperates with a geared surface 457 located on the first separating wheel 452 and the second gear 456 cooperates with a geared surface 458 located on the second separating wheel 462.

Positioned below the lower wheel housing 450 is a coin slide 464. A cover 466 having a hopper 468 is mounted atop the structure to constitute a top portion of the coin bank. The cover is selectively removable from the

coin bank as is illustrated in Figure 19, to provide access to the two separating wheels 452 and 462.

The coin slide 464 is provided with, in this case, eight coin sliding surfaces, each meant to accommodate a respective one of eight different diameters of coins. In this embodiment, the coins are dropped into the funnel 468. They will fall through an aperture 470 (Figure 18) and onto the second sorting wheel 462. As the motor 444 rotates, via the gears 446, the axle 454 and the first and second gears 455 and 456, the second gear 456 will cause the second separating wheel 462 to rotate in a clockwise direction, as shown in Figure 19. The coins held on the second separating wheel are moved and fall into respective ones of a plurality of apertures 482 in the second separating wheel 462. As an aperture of the wheel travels over the several increasingly larger sized apertures 484 in the housing 460, the four smallest diameter coins will fall through a respective one of the four apertures. The fifth aperture, however, is of a very large diameter so as to accommodate the remaining four diameters of coins.

These coins will then travel to the first separating wheel 452 and fall into one of a plurality of apertures 490 in the first separating wheel. As the motor 444 rotates, via the gears 446 and the axle 454, the first gear 455, it in turn will cause the first separating wheel 452 to also rotate, this time in a counter clockwise direction as is evident from Figure 19. The four larger diameter coins which have now fallen through the largest diameter aperture 486 in the second wheel housing 460 will now be moved by the first separating wheel 452 and pass over one of a plurality of openings 492 in the first wheel housing 450. As an aperture 490 of the wheel travels over the several increasingly larger size apertures 492 in the first wheel housing 450, each remaining coin, i.e., the four largest diameter coins, being held will fall through the correctly sized opening and fall onto the associated

one of the coin sliding surfaces. The coins will then travel down the coin slide 464 and fall through the associated ones of a plurality of apertures and into a respective one of the eight coin containers 436 and be stacked therein.

After the coin sorting process is done, and when it is desired to remove the coins which have been stored, the drawer 430 is pulled forwardly from its retracted position and into its extended position. After this is done, the coin tubes 436 can then be removed from the tube base 432. In this embodiment, unlike the first embodiment, the tube base 432 can be rigidly positioned in the drawer 430. Alternatively, the tube base 432 can rotate only a minimal amount if so desired.

The invention has been described with reference to several preferred embodiments. Obviously, modifications and alterations will occur to others upon a reading and understanding of the preceding specification. It is intended that the invention be construed as including all such modifications and alterations insofar as they come within the scope of the appended claims and the equivalents thereof.

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Having now described the preferred embodiment, the invention is claimed to be:

1. A coin bank comprising:

a housing (10, 14, 40, 410, 414, 440) including a coin receiving area (68, 468) for receiving unsorted coins;

a coin sorting assembly (60, 62, 450, 452, 460, 462) mounted in said housing;

a drawer (30, 430) slidably mounted in said housing beneath said coin sorting assembly; and,

at least one coin tube (36, 436) mounted in said drawer for holding sorted coins, wherein said drawer moves from a retracted position to an extended position in relation to said housing.

2. The coin bank of claim 1 further comprising a coin slide structure (64, 464) positioned in said housing and located between said coin sorting assembly (60, 62, 450, 452, 460, 462) and said drawer (30, 430).

3. The coin bank of claim 2 wherein said coin slide structure comprises a plurality of coin slide areas (140 - 148) positioned side by side, one slide area leading to each of said plurality of coin tubes.

4. The coin bank of claim 3 wherein said coin slide structure comprises an upper end (149) and a lower end (150).

5. The coin bank of claim 4 wherein said coin slide area further comprises an aperture (152a - 152e) communicating with each of the plurality of coin slide areas.

6. The coin bank of claim 1 further comprising a coin tube support(32, 432) mounted in said drawer.

7. The coin bank of claim 6 wherein said coin tube support comprises a base wall and a side wall.

8. The coin bank of claim 7 wherein said coin tube support base wall includes a plurality of recessed areas (232 - 240, 434), one for accommodating a lower end of a respective one of said plurality of coin tubes (36, 436).

9. The coin bank of claim 8 wherein each of said plurality of coin tubes includes a base wall (37) having an aperture (38) and wherein each of said plurality of recessed areas includes a centrally positioned post (242 - 250) which protrudes through a respective one of said coin tube base wall apertures.

10. The coin bank of claim 8 wherein said coin tube support further comprises a top wall (34) which communicates with a coin overflow area (20) located in said housing.

11. The coin bank of claim 8 wherein said plurality of recessed areas (434) in said coin tube support base wall are elongated to allow a pivoting movement of said at least one coin tube (436) held on said coin tube support base wall in relation to said coin tube support base wall.

12. The coin bank of claim 6 wherein said coin tube support (32) is pivotally mounted in said drawer (30).

13. A method of sorting coins comprising:

providing a housing having a coin sorting assembly(60, 62, 450, 452, 460, 462), a drawer(30, 430) and at least one coin tube(36, 436);

placing the at least one coin tube in the drawer;

sorting coins with the coin sorting assembly;

placing the sorted coins into the at least one coin tube;

moving the drawer from a retracted position to an extended position;

removing the at least one coin tube from the drawer.

14. The method of claim 13 further comprising the step of tilting the at least one coin tube(36, 436) from a first orientation in relation to the drawer(30, 430) to a second orientation prior to the step of removing the at least one coin tube.

15. The method of claim 14 wherein said step of tilting comprises the subsidiary step of pivoting a coin tube support(32) in relation to the drawer(30).

16. The method of claim 14 wherein said step of tilting comprises the subsidiary step of moving the coin tube in an elongated recessed area(434) in a coin tube support(432) mounted in the drawer(430).

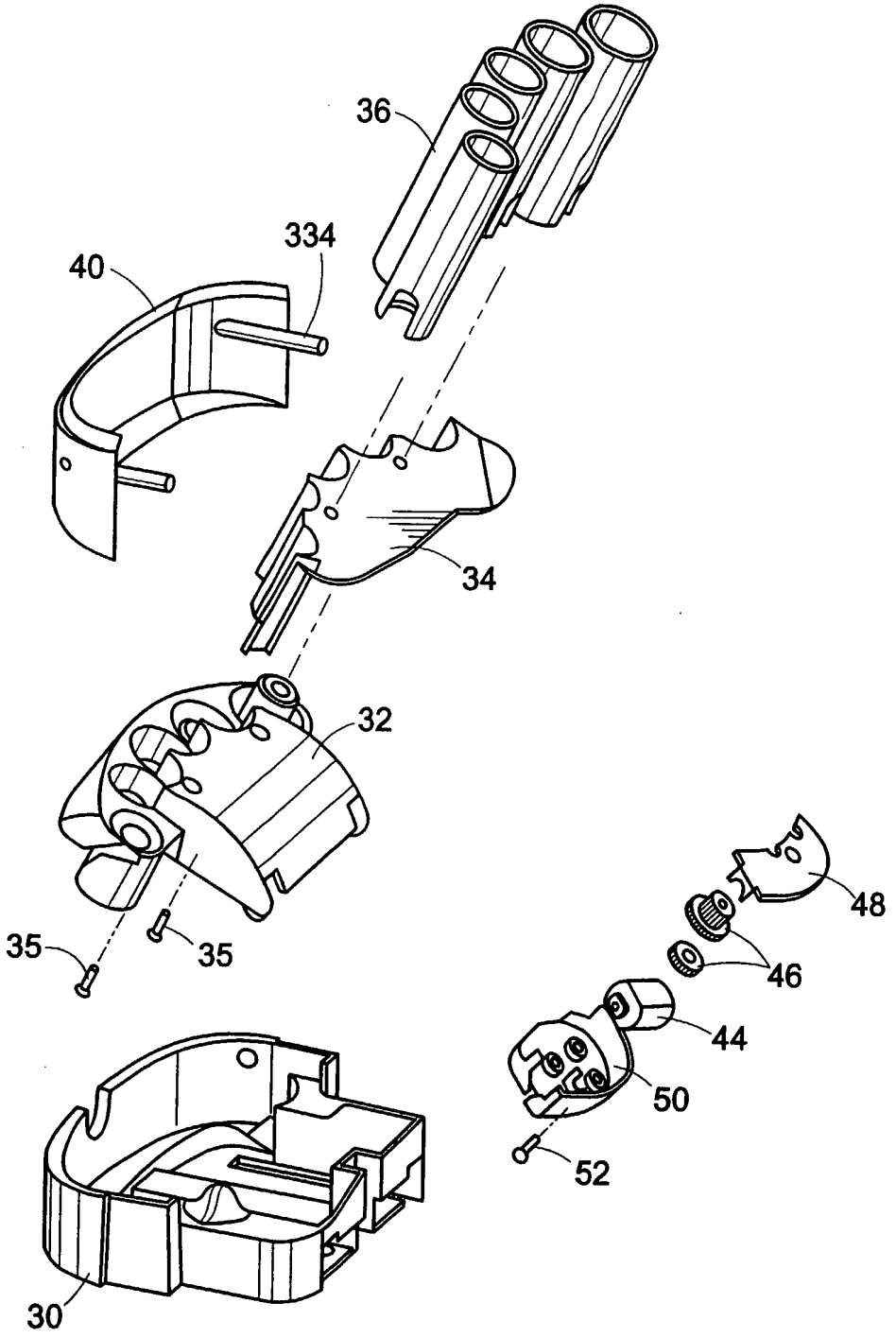
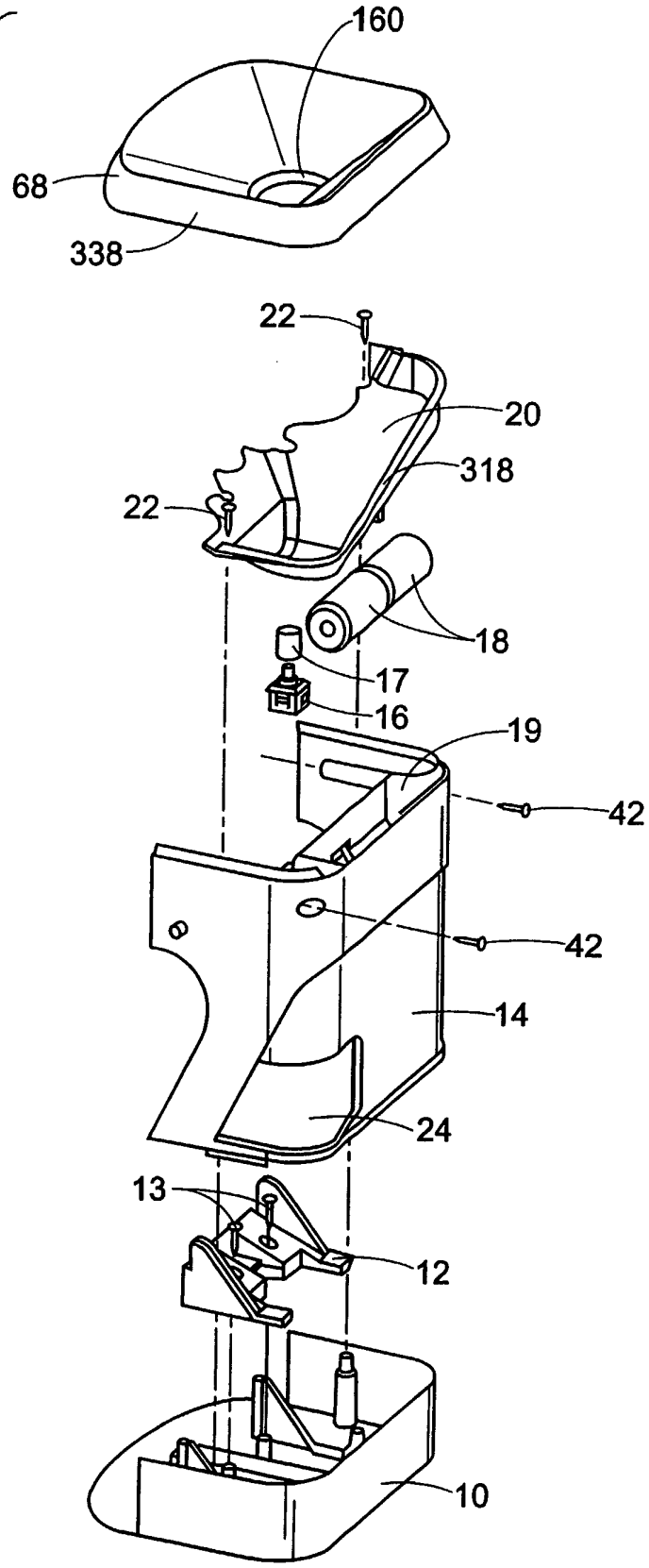


FIG. 1A

FIG. 1B



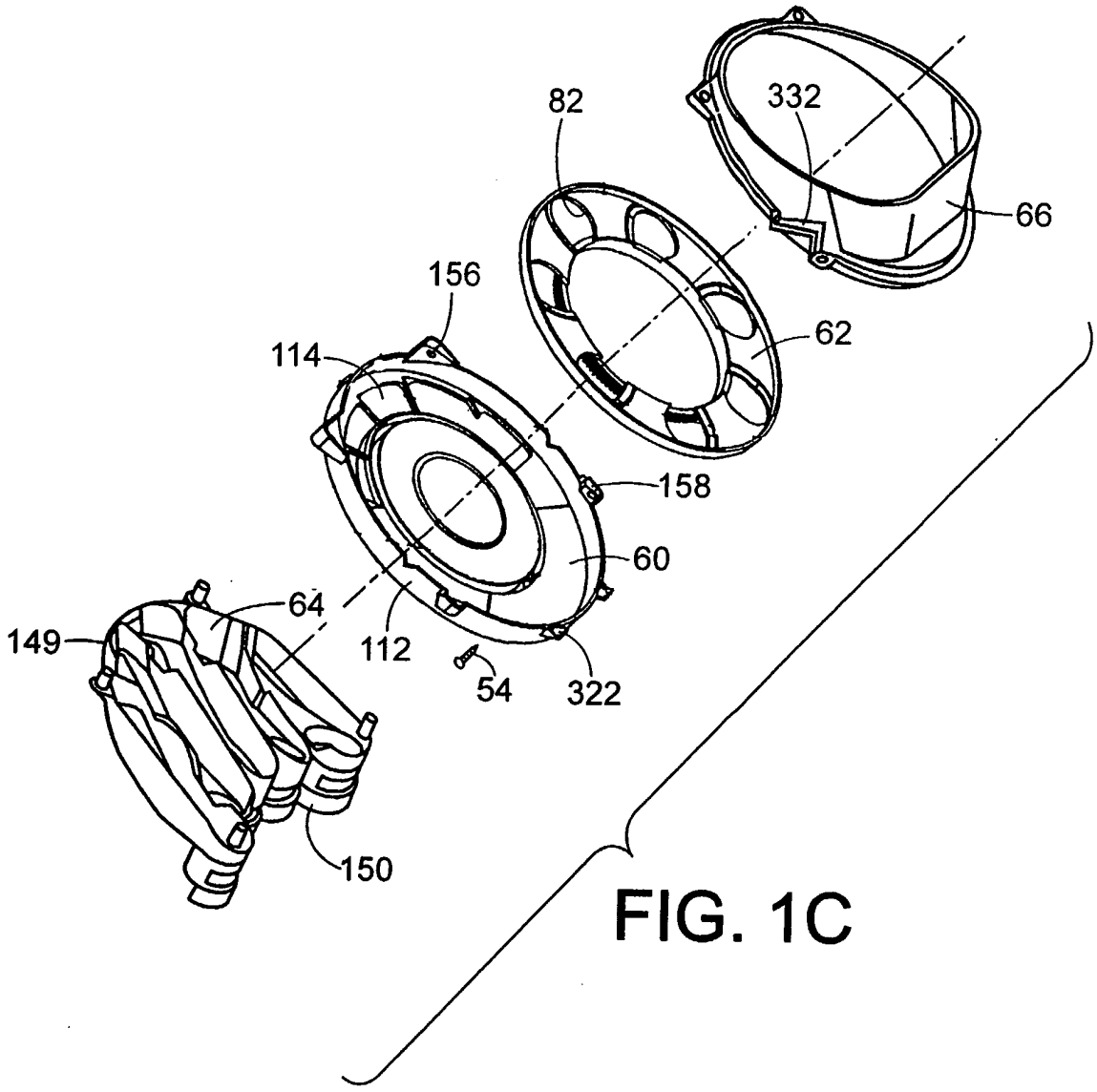


FIG. 1C

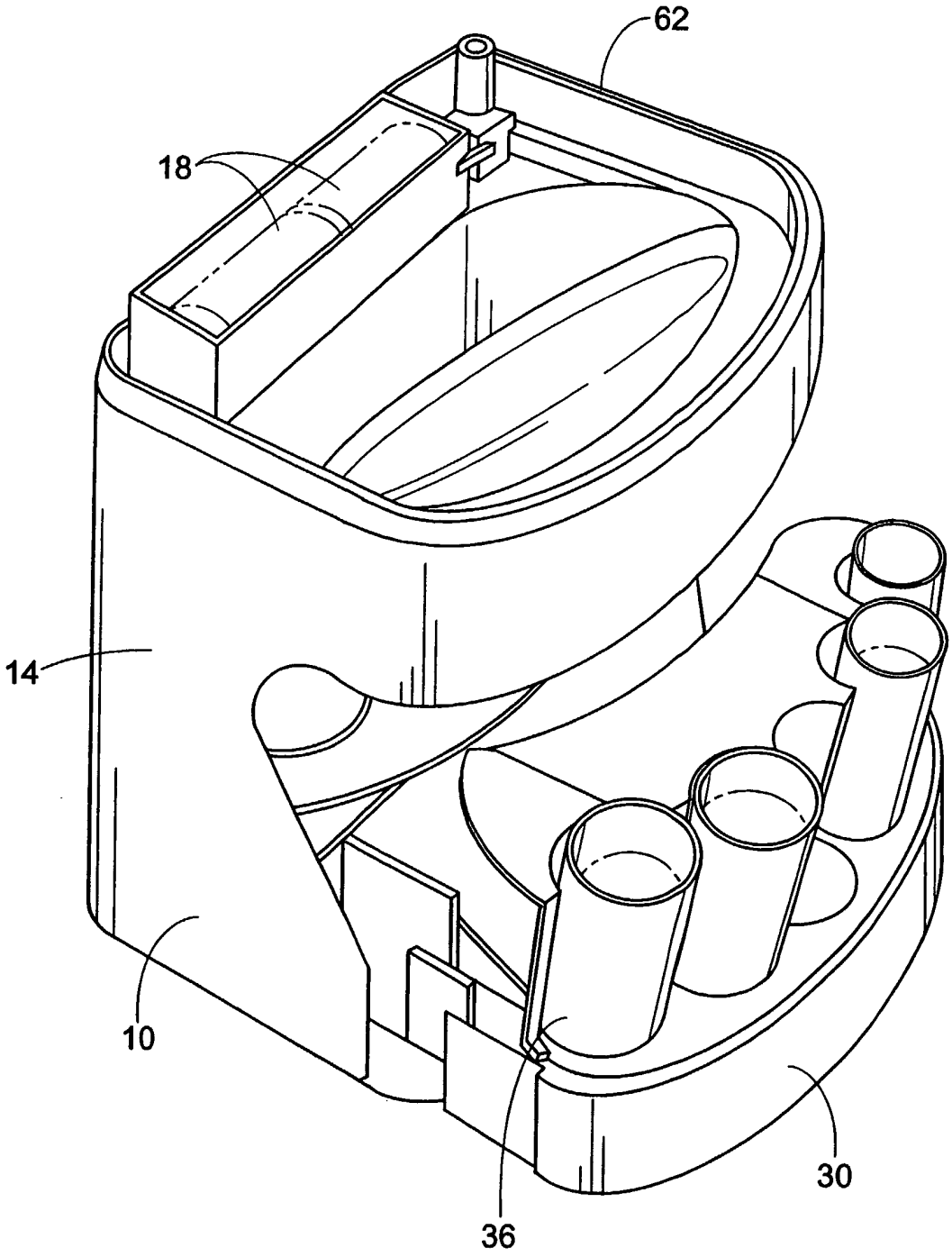


FIG. 2

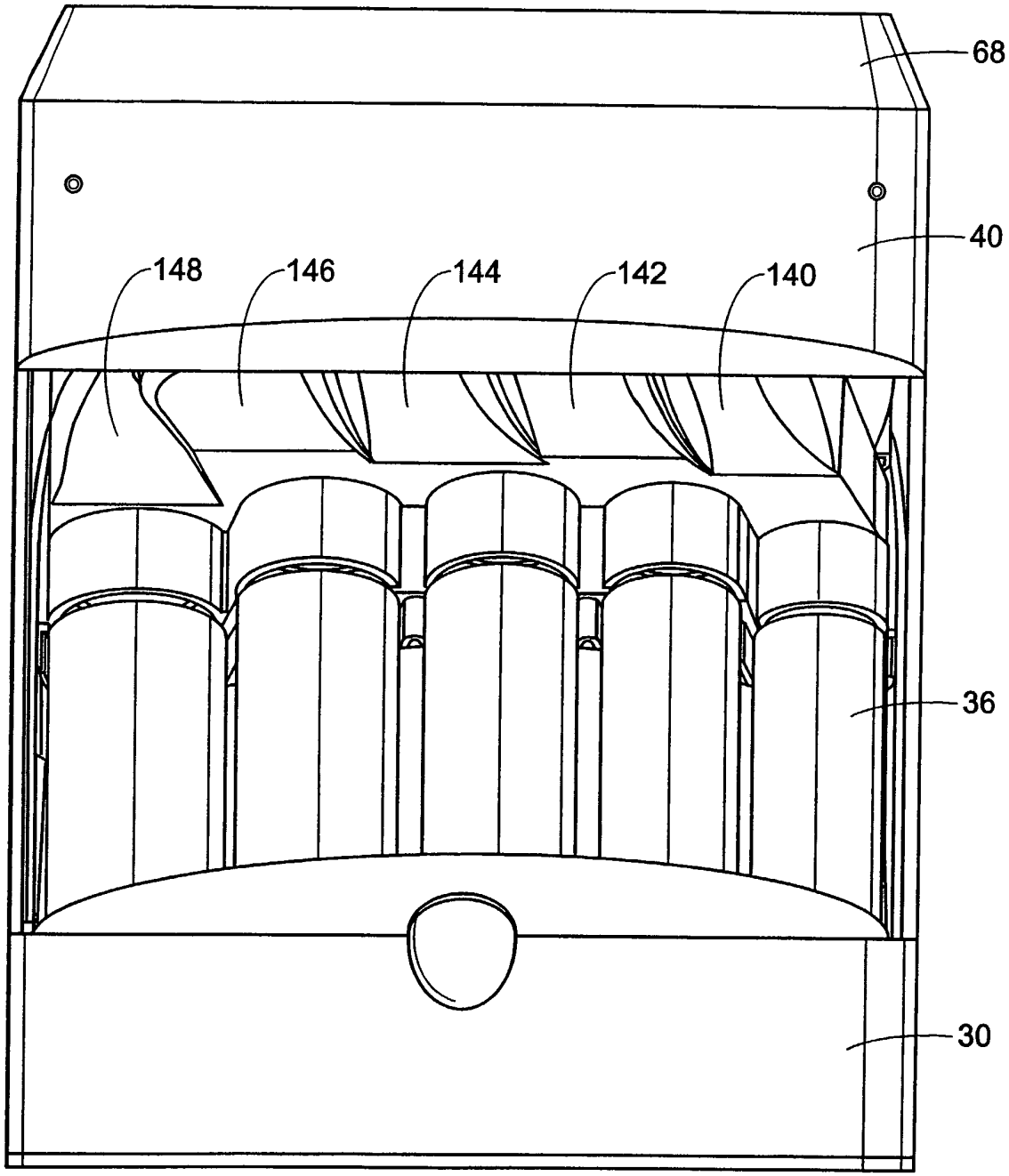


FIG. 3

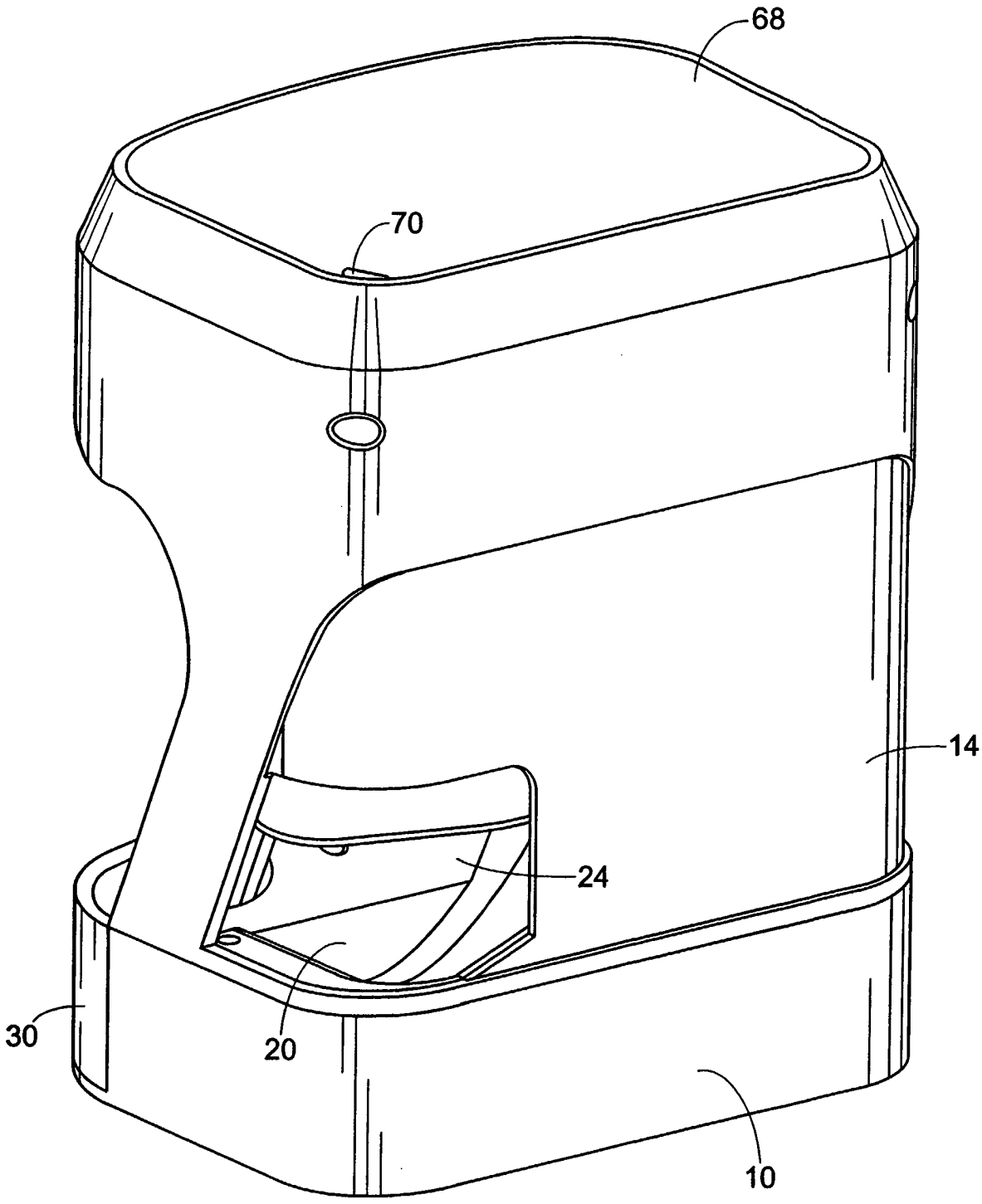


FIG. 4

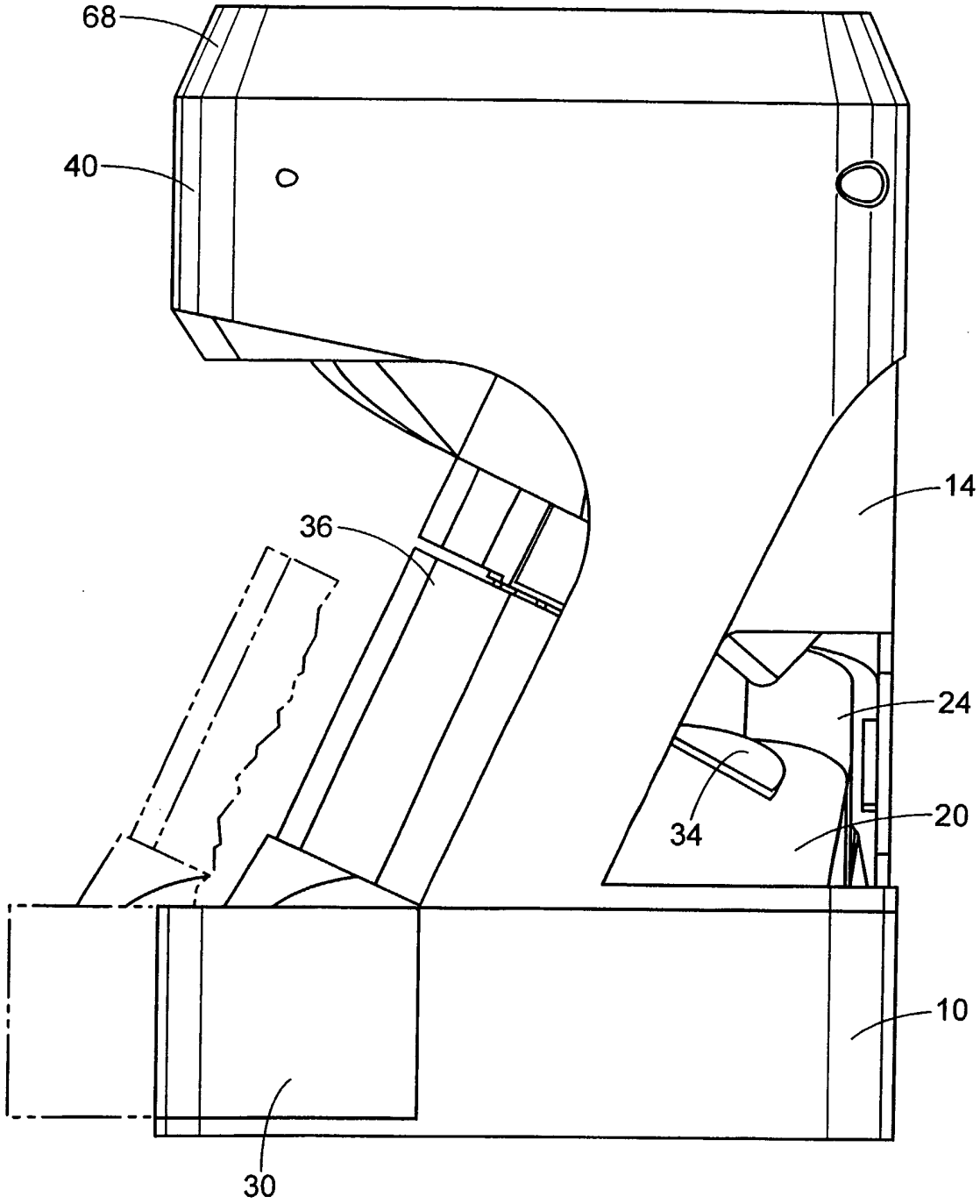


FIG. 5

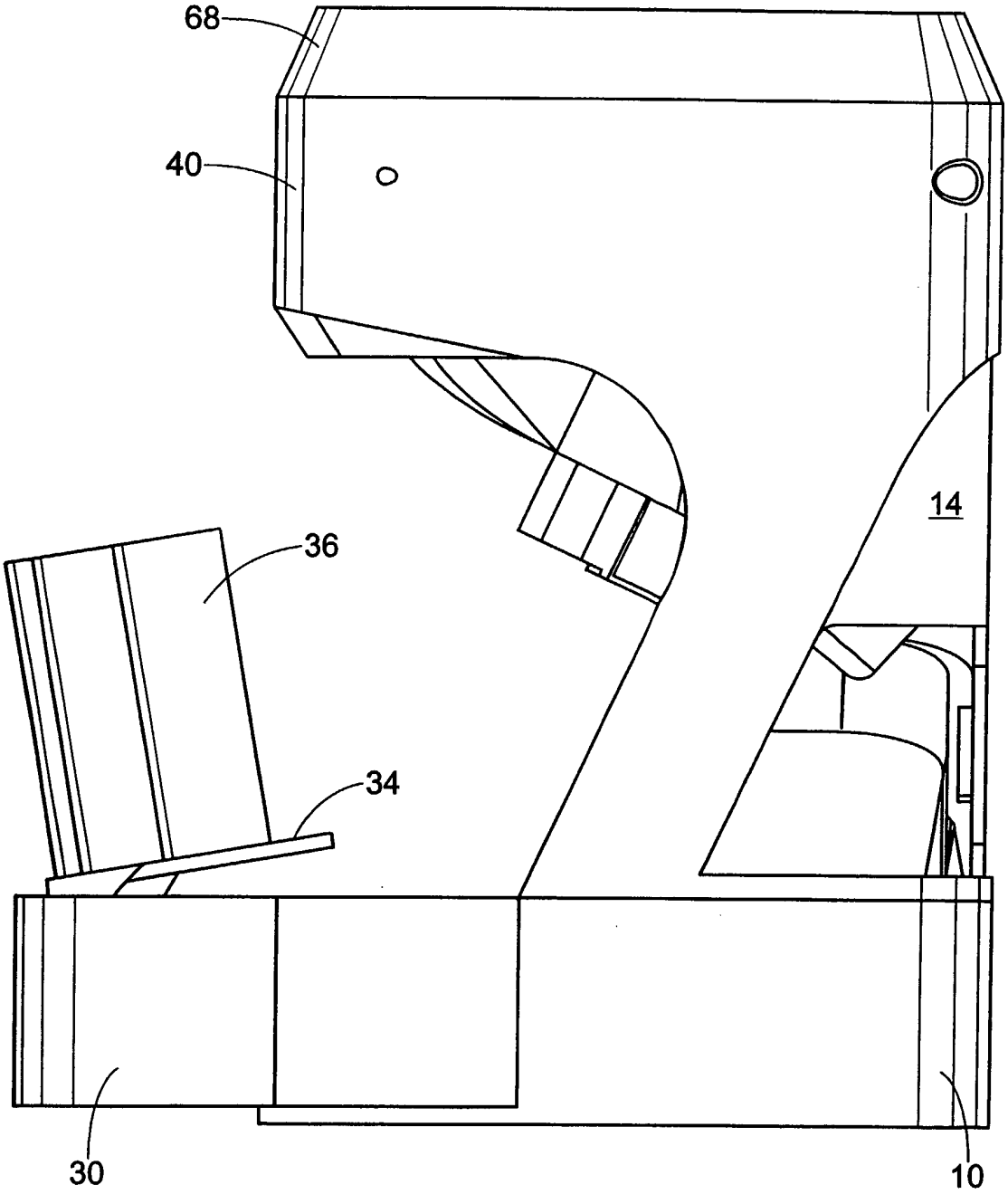


FIG. 6

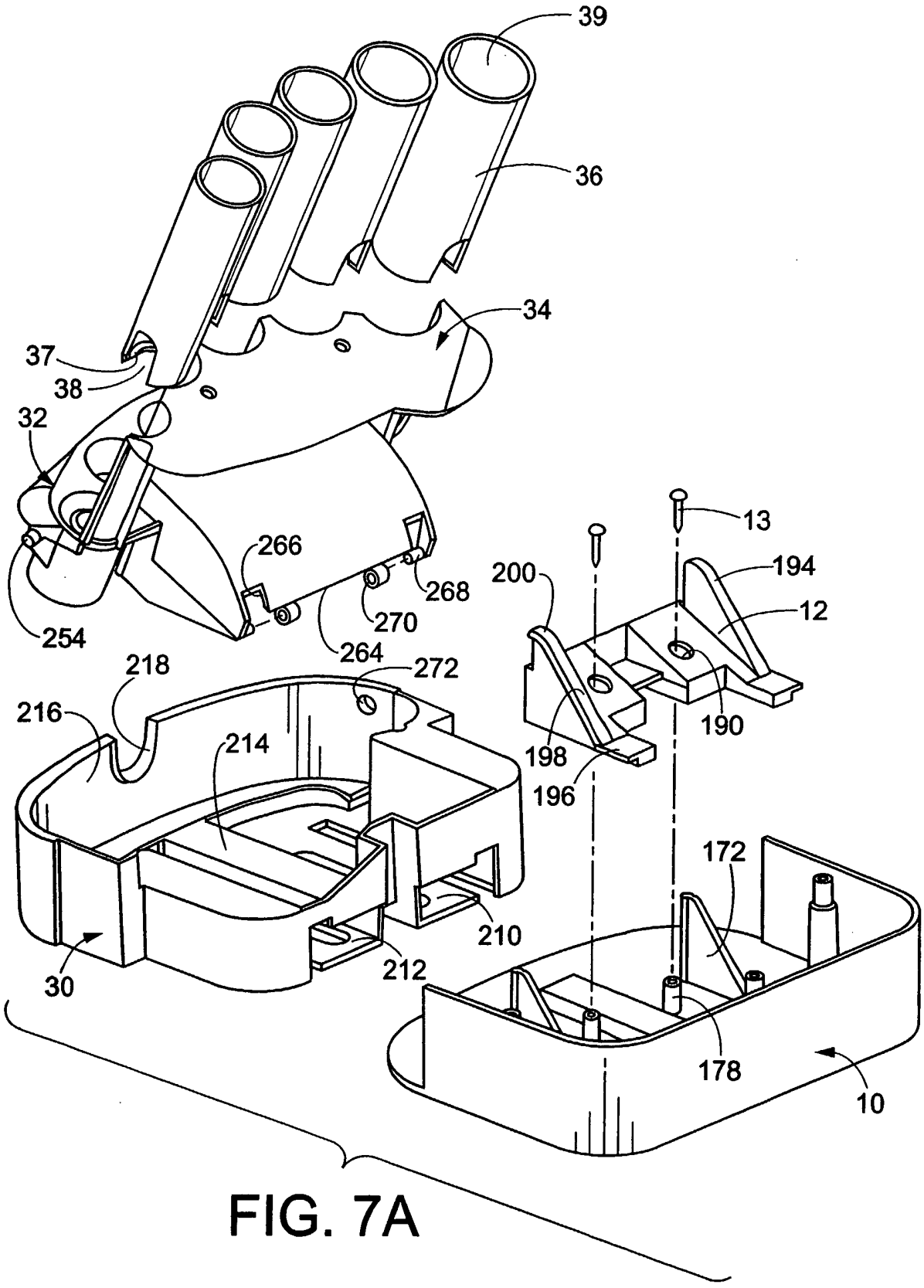
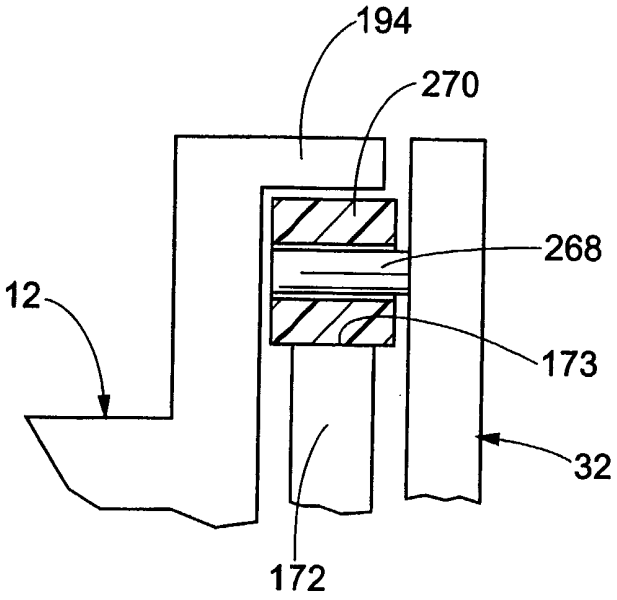

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FIG. 7A

FIG. 7B



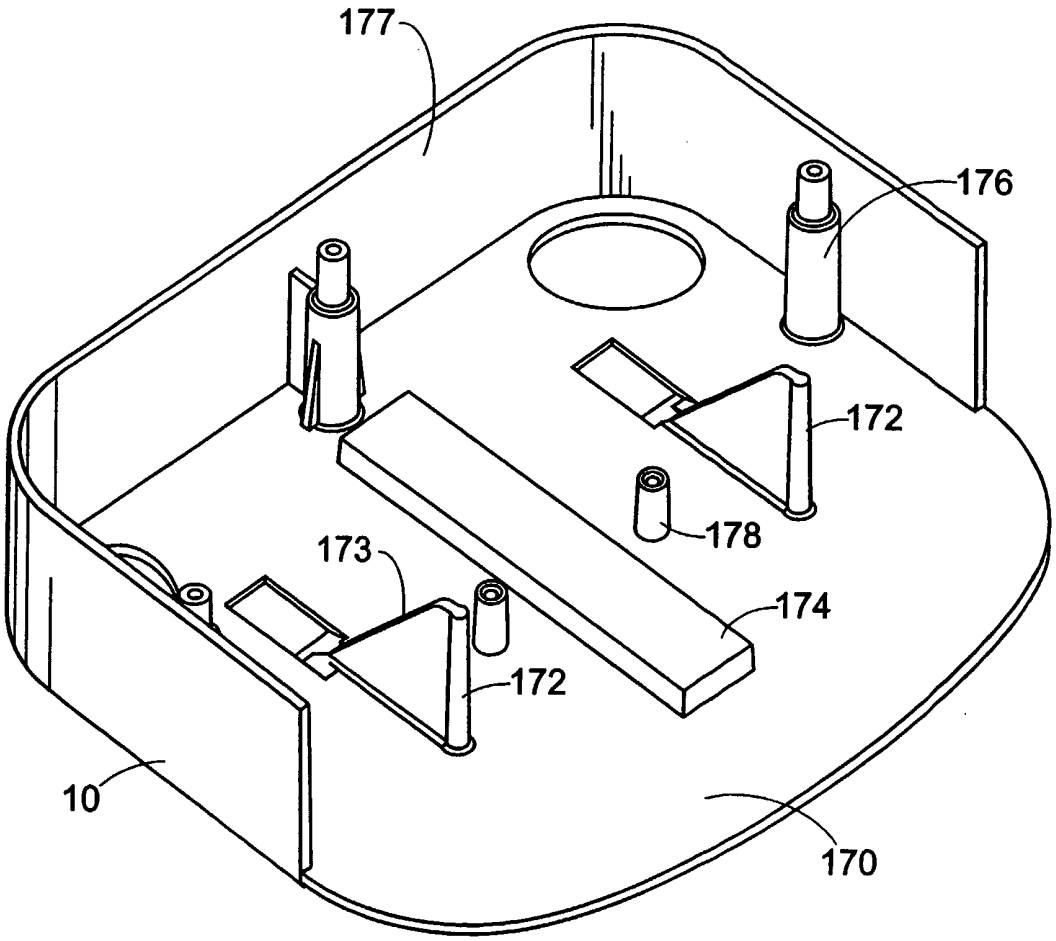


FIG. 8

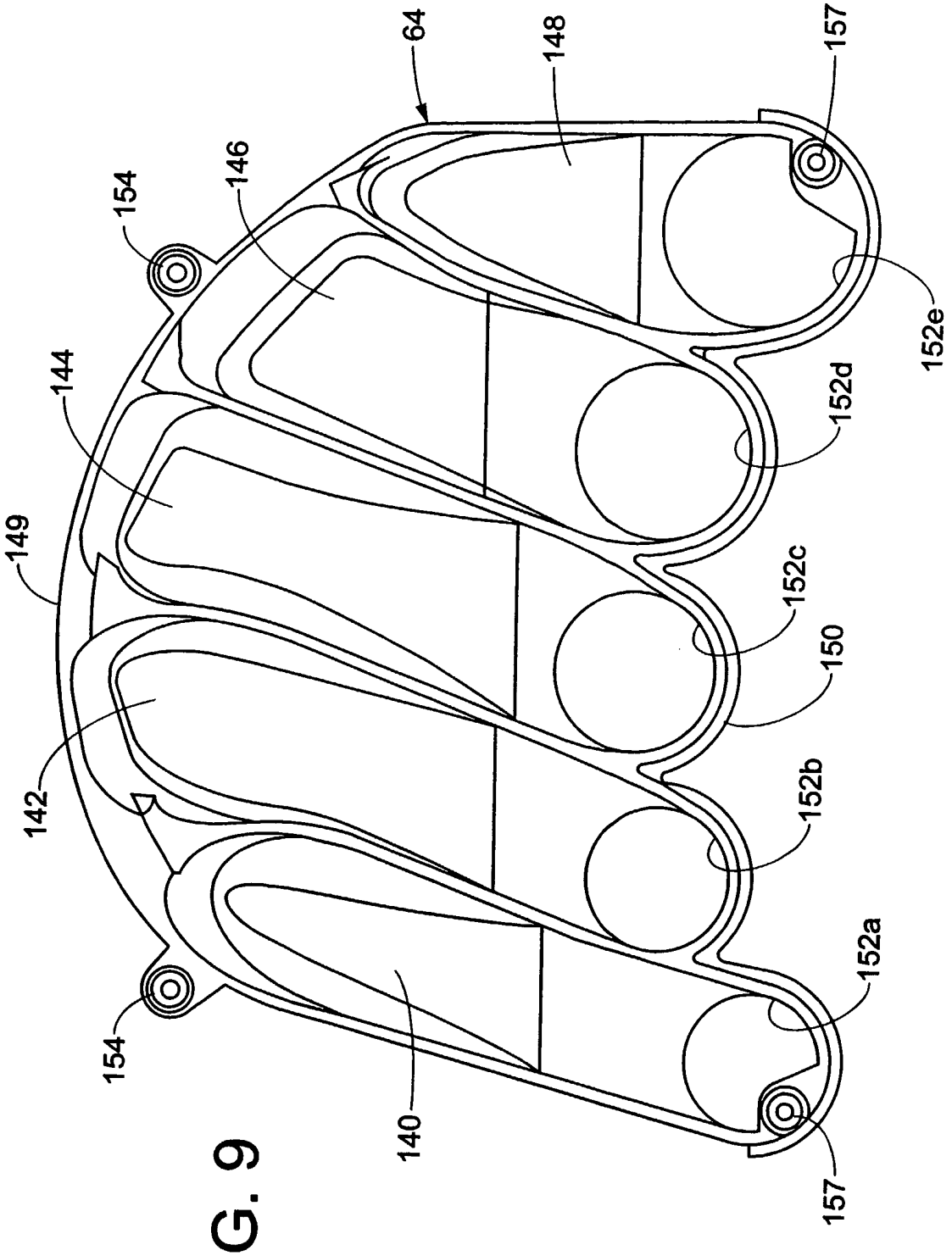

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FIG. 9

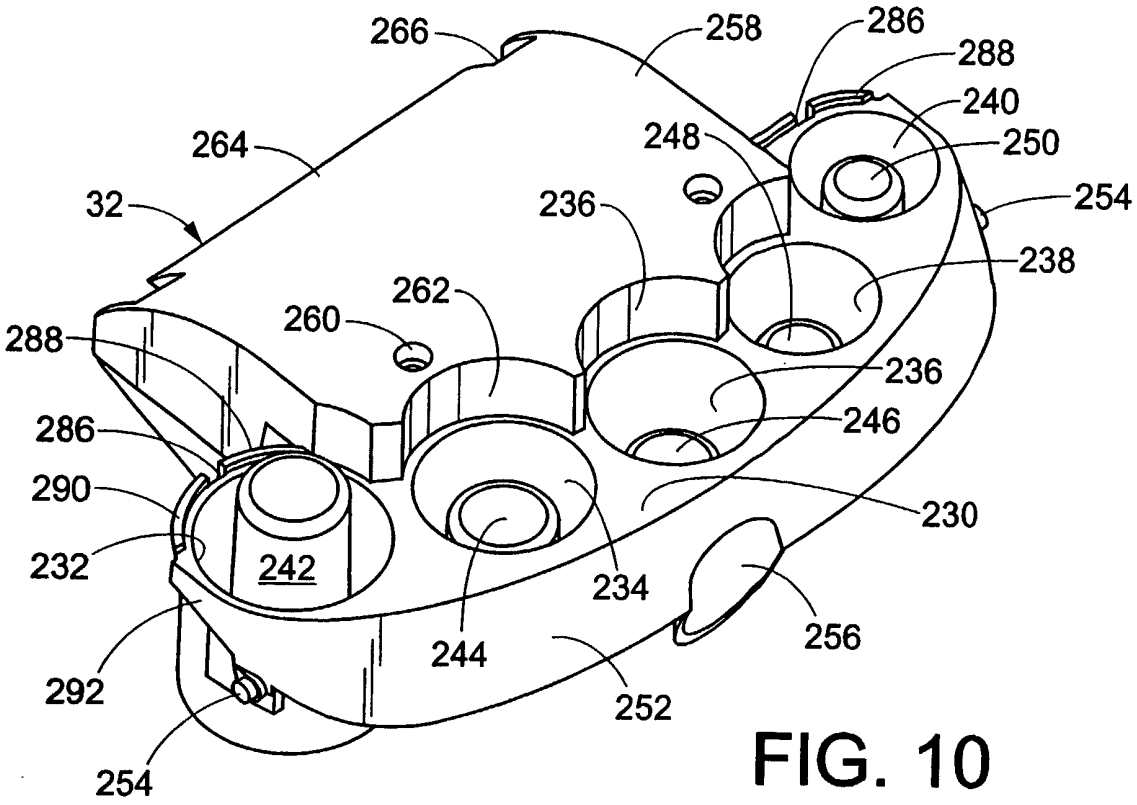

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FIG. 10

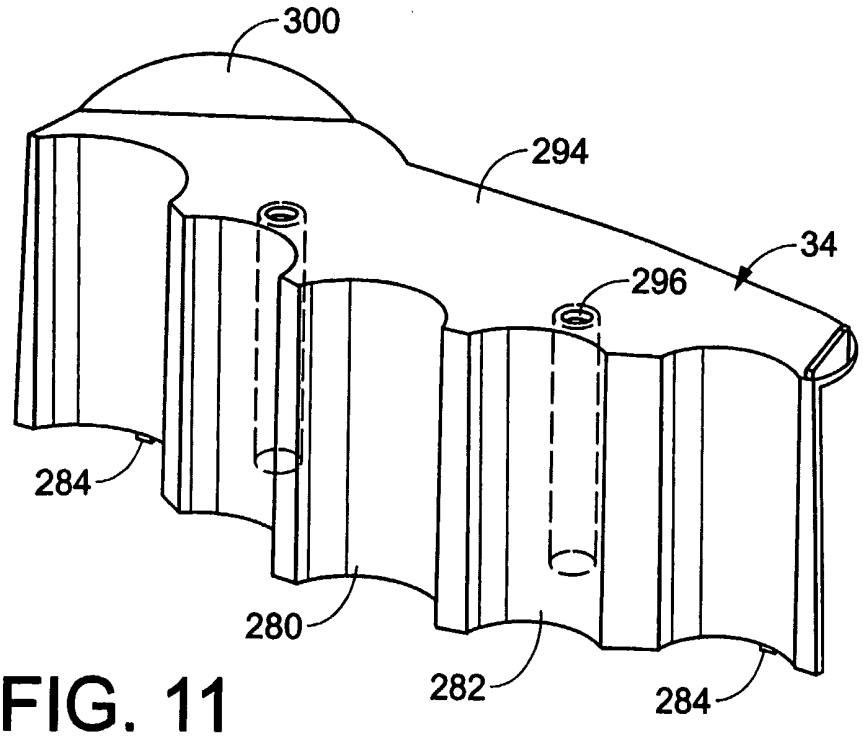

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FIG. 11

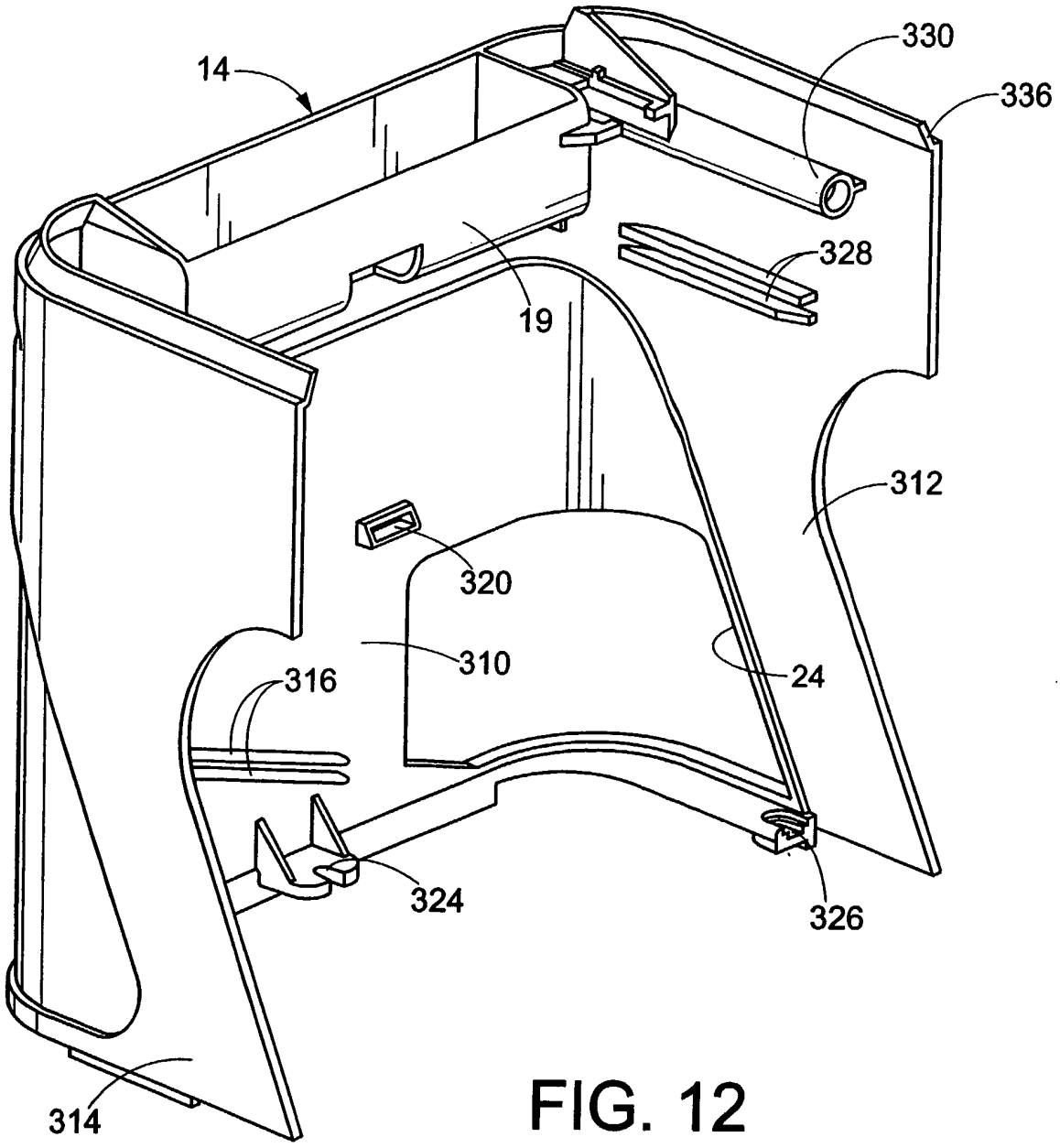


FIG. 12

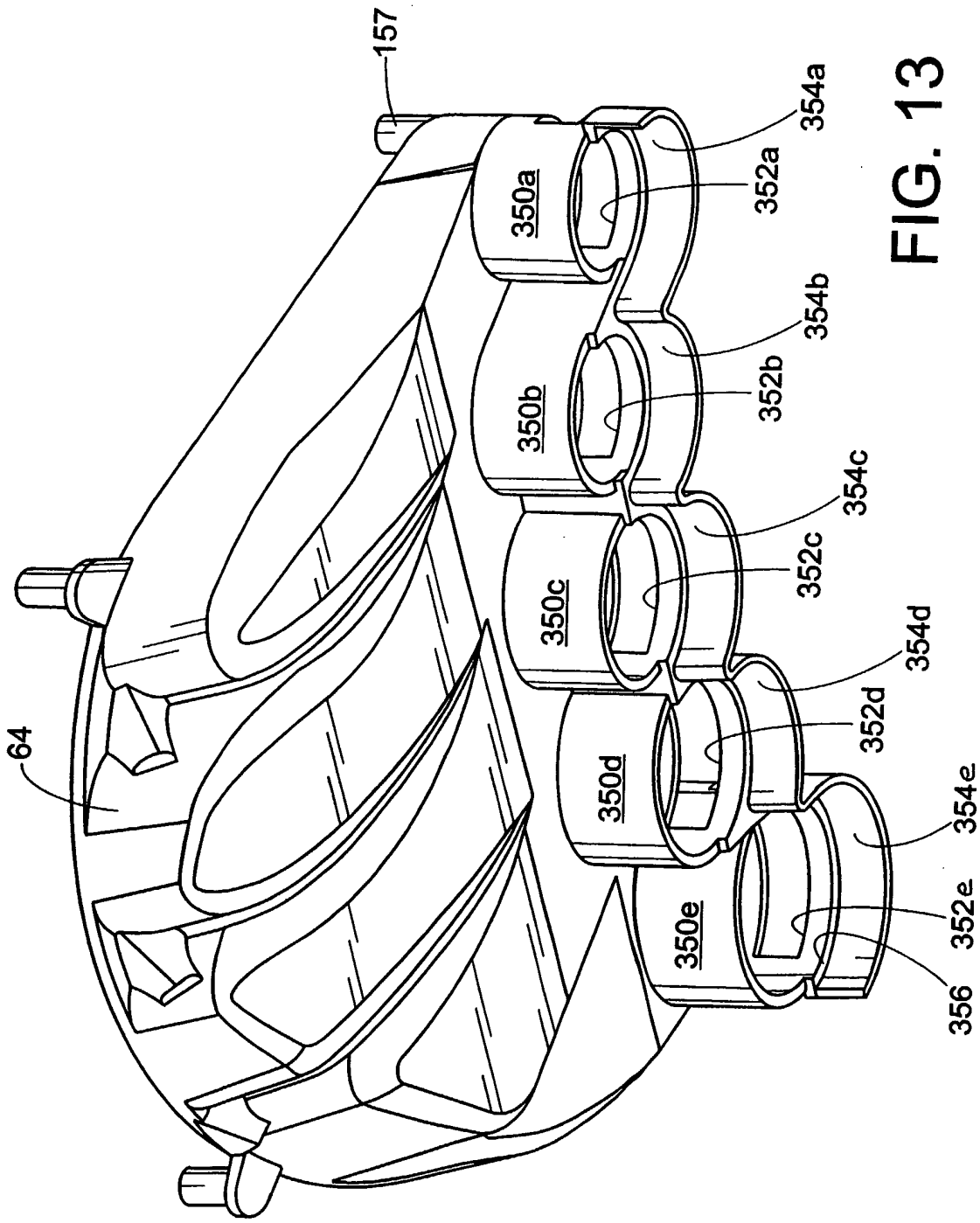

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FIG. 13

FIG. 14

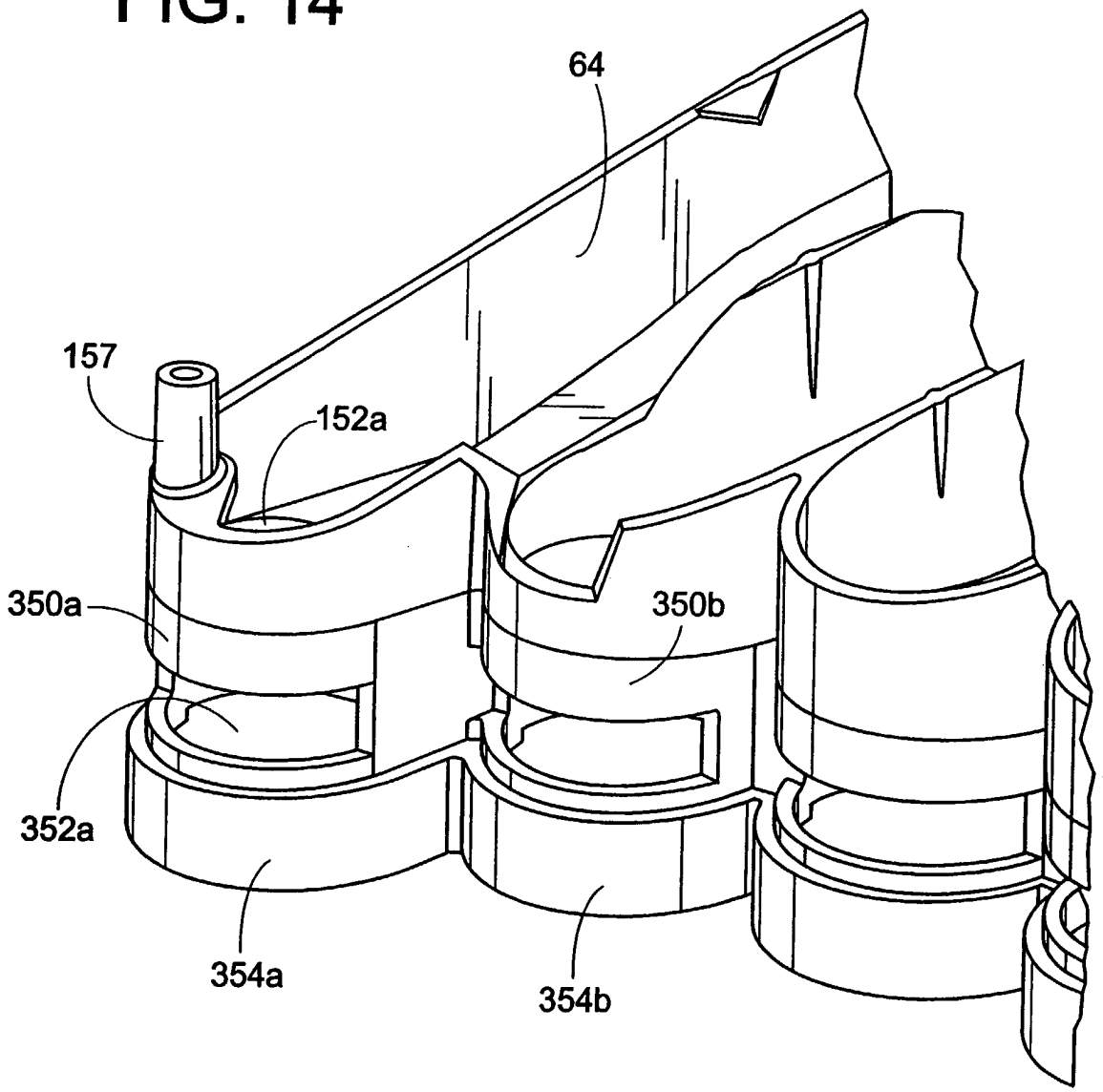
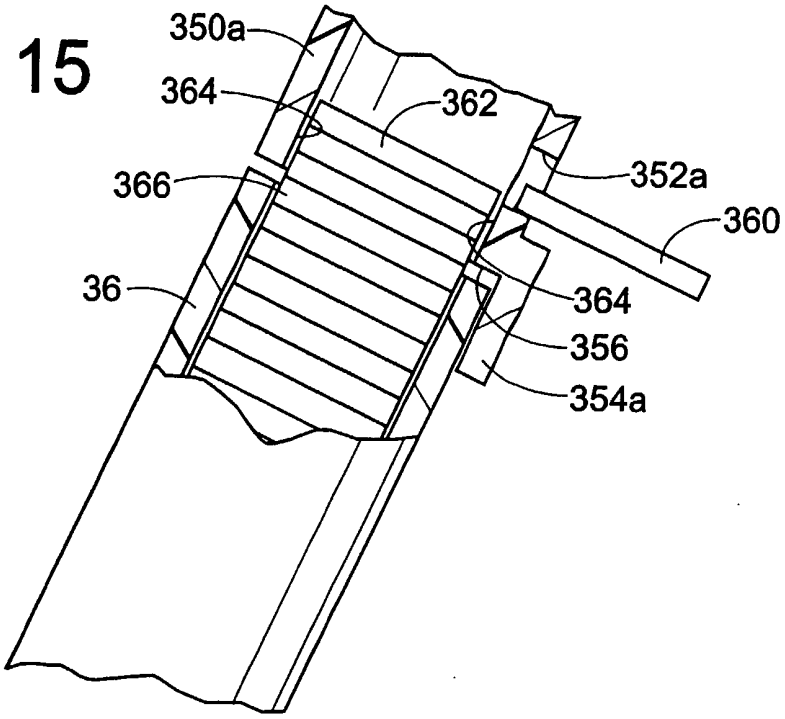


FIG. 15


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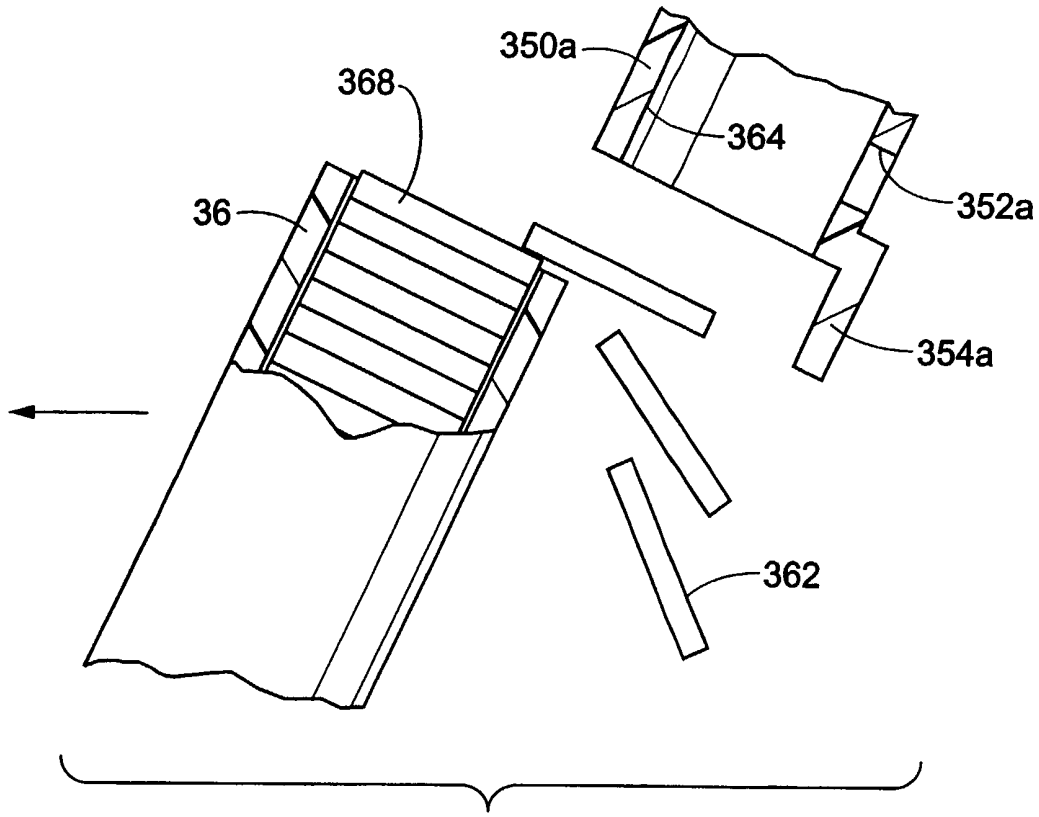

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FIG. 16

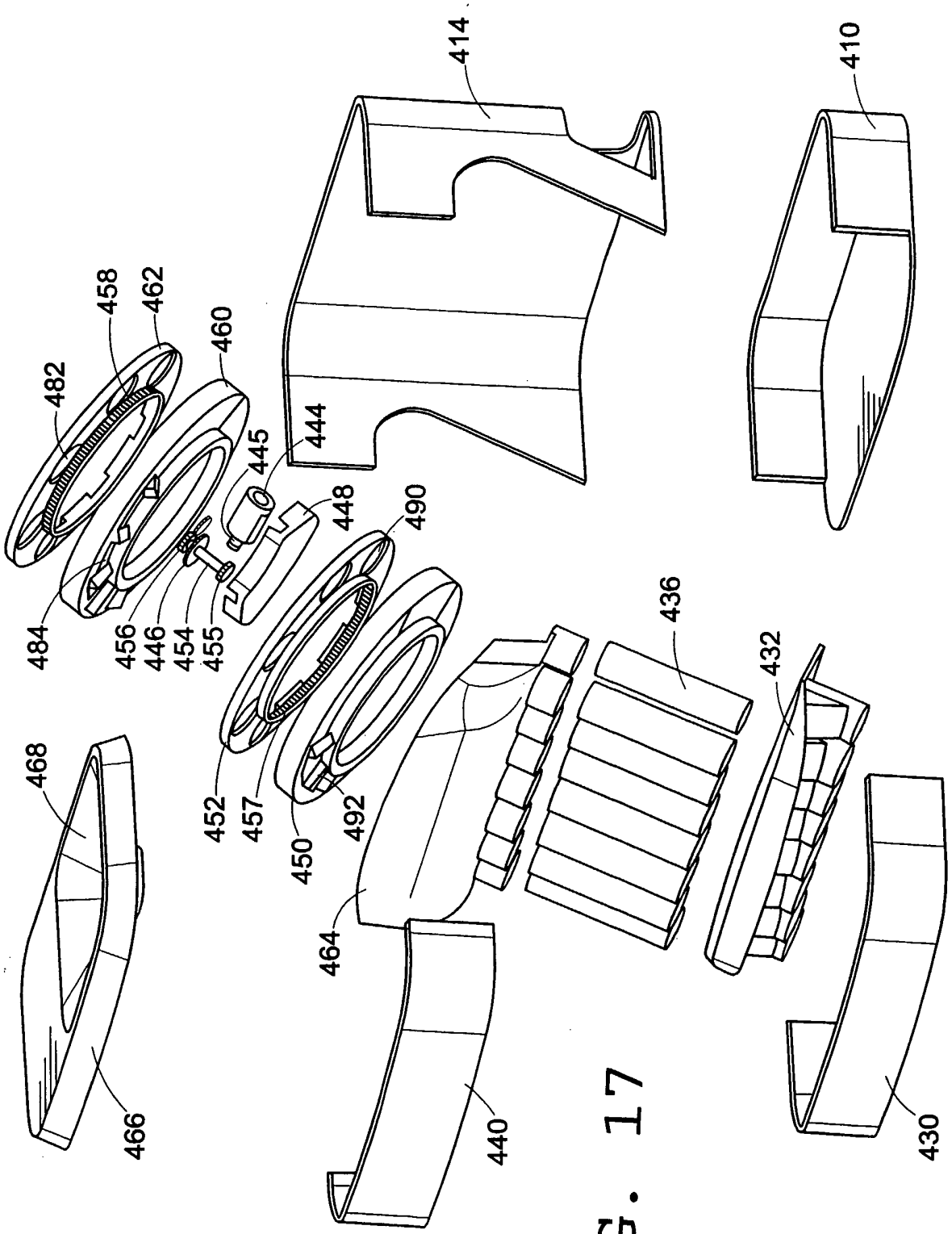

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FIG. 17

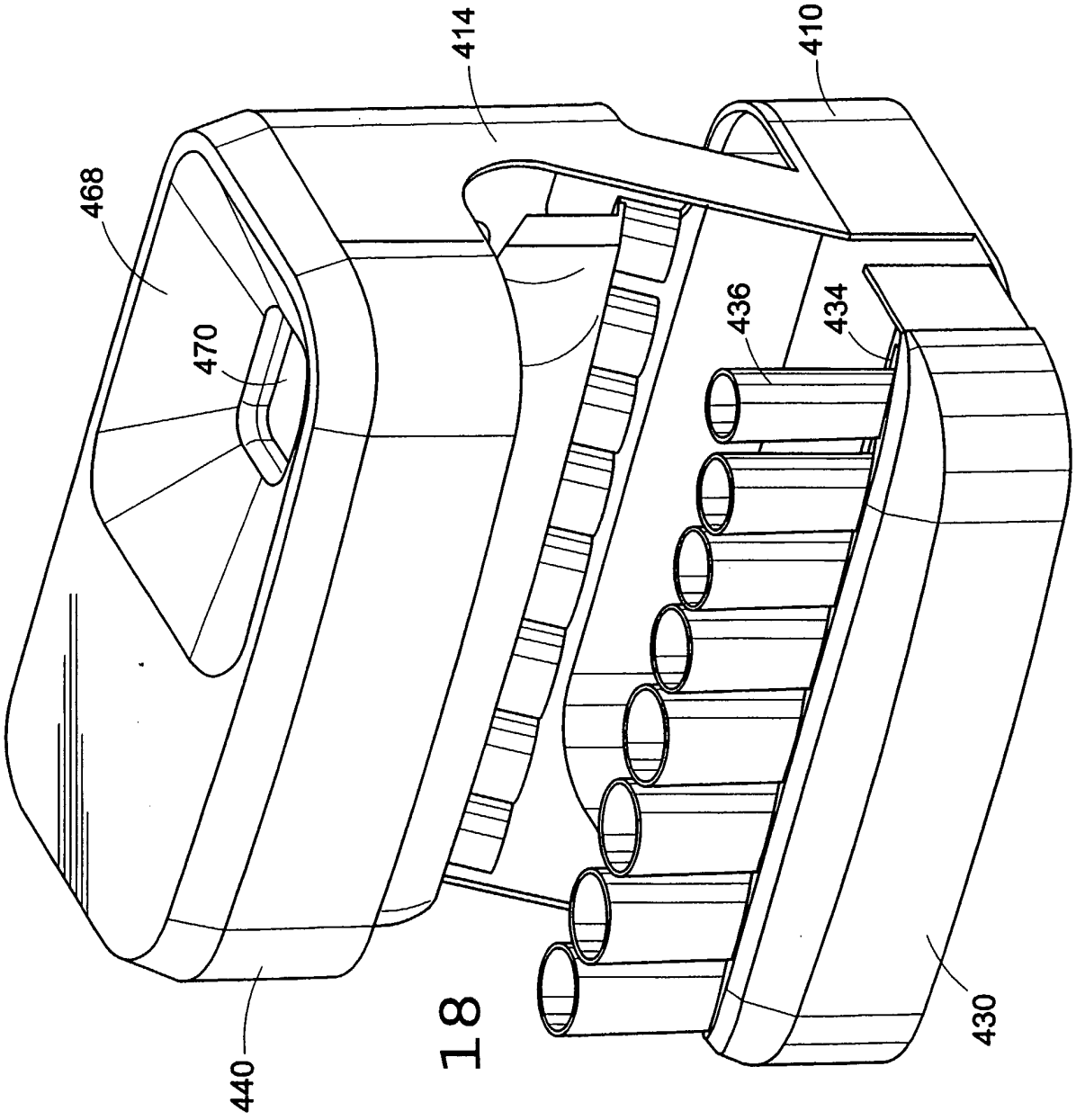


FIG. 18

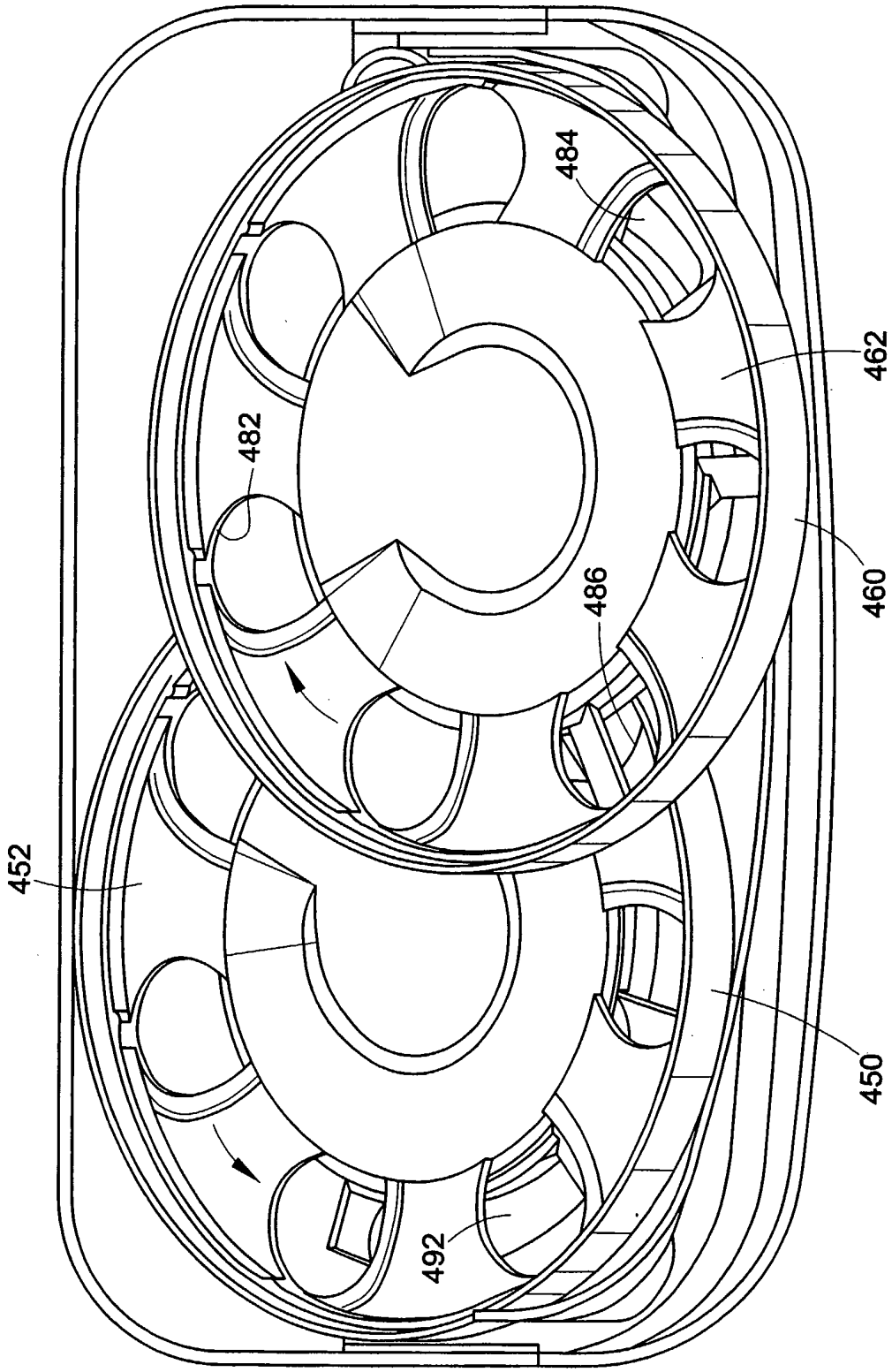


FIG. 19

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US02/03447

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G07D 3/00
US CL : 453/13

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 453/13

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
East

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A, P	US 6,267,663 B1 (NOTTINGHAM ET AL) 31 July 2001 (31.07.2001), entire document.	1-16
A	US 6,055,521 A (RAMSEY et al) 25 April 2000 (25.04.2000), entire document.	1-16
A	US 2,886,045 A (BROWN et al) 12 May 1959 (12.05.1959), entire document.	1-16
A	US 3,227,363 A (HECKER et al) 04 January 1966 (04.01.1966), entire document.	1-16
A	US 4,109,139 A (McMILLIAN et al) 22 August 1978 (22.08.1978), entire document.	1-16
A	US 4,275,751 A (BERGMAN) 30 June 1981 (30.06.1981), entire document.	1-16
A	US 4,606,361 A (NOTTINGHAM et al) 19 August 1986 (19.08.1986), entire document.	1-16

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 March 2002 (29.03.2002)	10 MAY 2002
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer Donald P. Walsh Diane Smith f Telephone No. (703)308-1113

Form PCT/ISA/210 (second sheet) (July 1998)